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Sacks

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(54) **CLEANING DEVICE**

(75) Inventor: **Roland Sacks**, Bubikon (CH)

(73) Assignee: **AVET. AG**

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Related U.S. Application Data

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(30) **Foreign Application Priority Data**

Mar. 14, 2005 (DE) ..... 20 2005 004 060 U

(51) **Int. Cl.**

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A47L 13/26	(2006.01)
A46B 11/00	(2006.01)
B05B 1/00	(2006.01)

(52) **U.S. Cl.** **401/138**; 401/137; 401/139; 401/268; 239/597

(58) **Field of Classification Search** 401/136–140, 401/263, 268; 239/597–599

See application file for complete search history.

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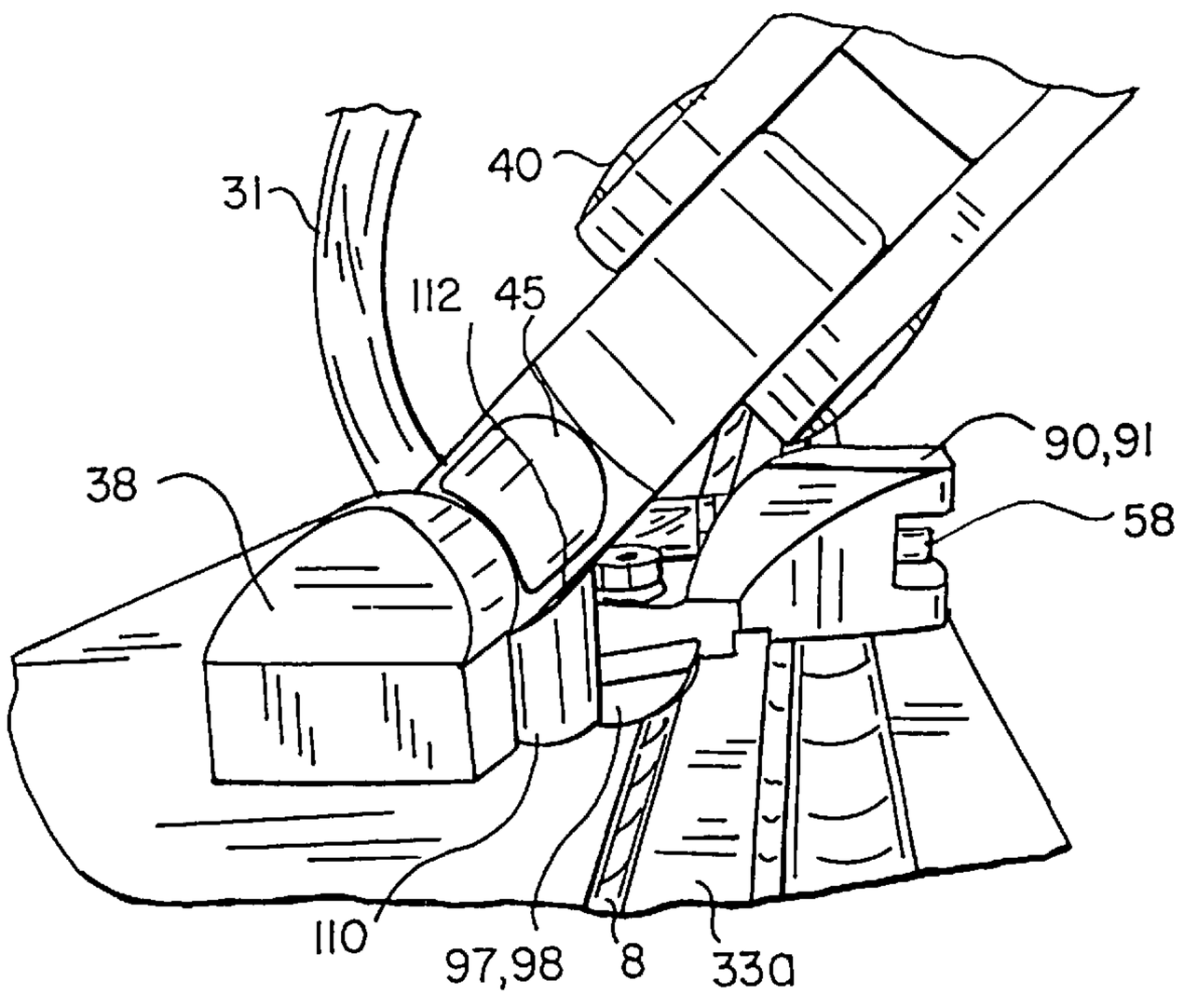
Primary Examiner—David J. Walczak
Assistant Examiner—Ryan Varnum
(74) *Attorney, Agent, or Firm*—Robert M. Schwartz; David W. Barman

(57) **ABSTRACT**

A cleaning device includes a support shaft; a retaining plate connected to a distal end of the support shaft by pivot elements; a cleaning pad detachably secured to a lower surface of the retaining plate; a fluid reservoir attached to the support shaft; and a flat jet spray assembly secured upon the upper surface of the retaining plate within its perimeter. The flat jet spray assembly includes a spray head having a securing flange with an inclined base at the rear portion; and a front portion having a slot-shaped spray jet outlet being open at side edges and a channel around a center of, and in perpendicular to, the slot-shaped spray jet outlet; a spray nozzle disposed within the channel, which has a horizontal emission slit; and a fluid feed tubing connected between the fluid reservoir and the spray nozzle.

21 Claims, 10 Drawing Sheets



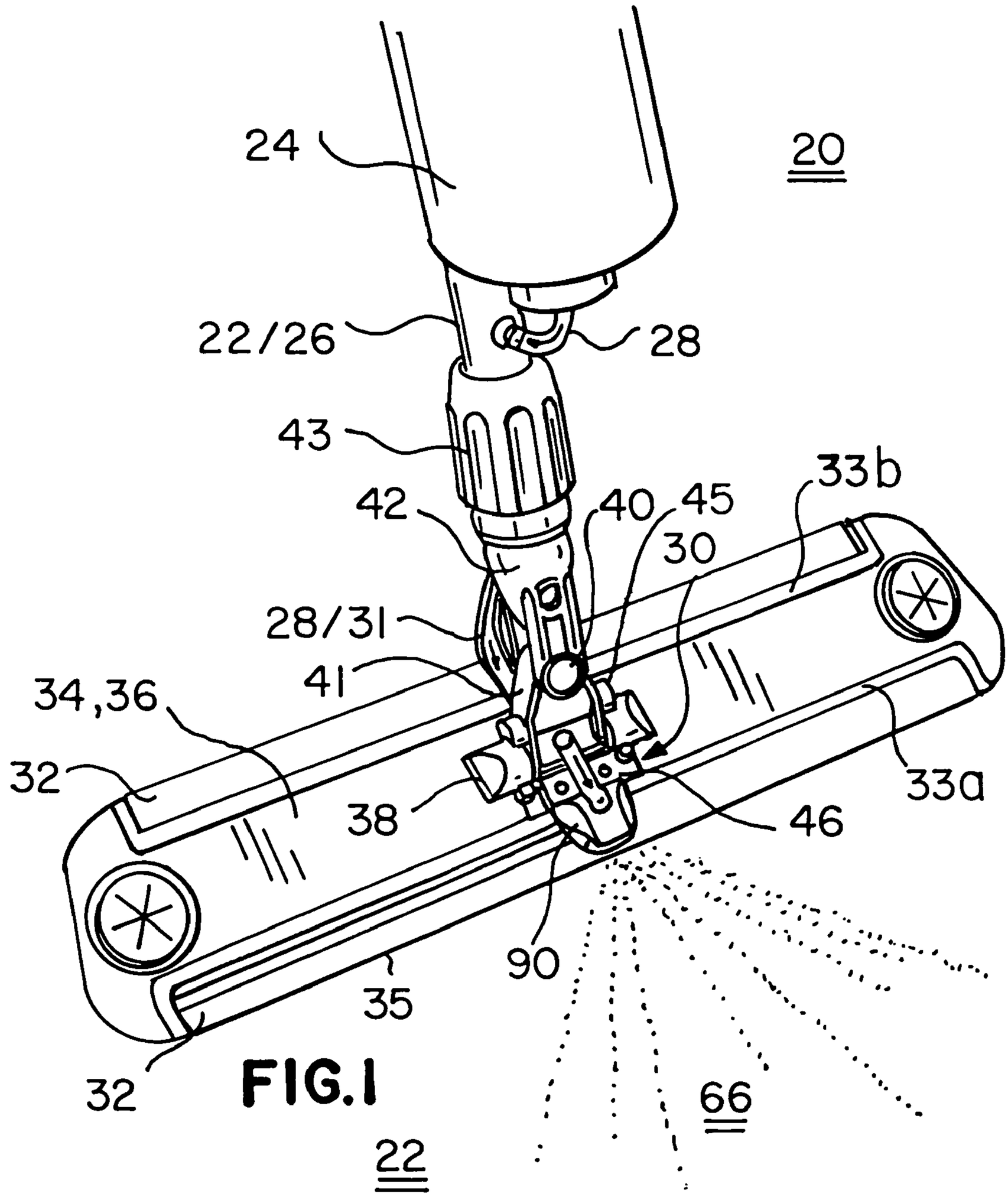

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FIG.1

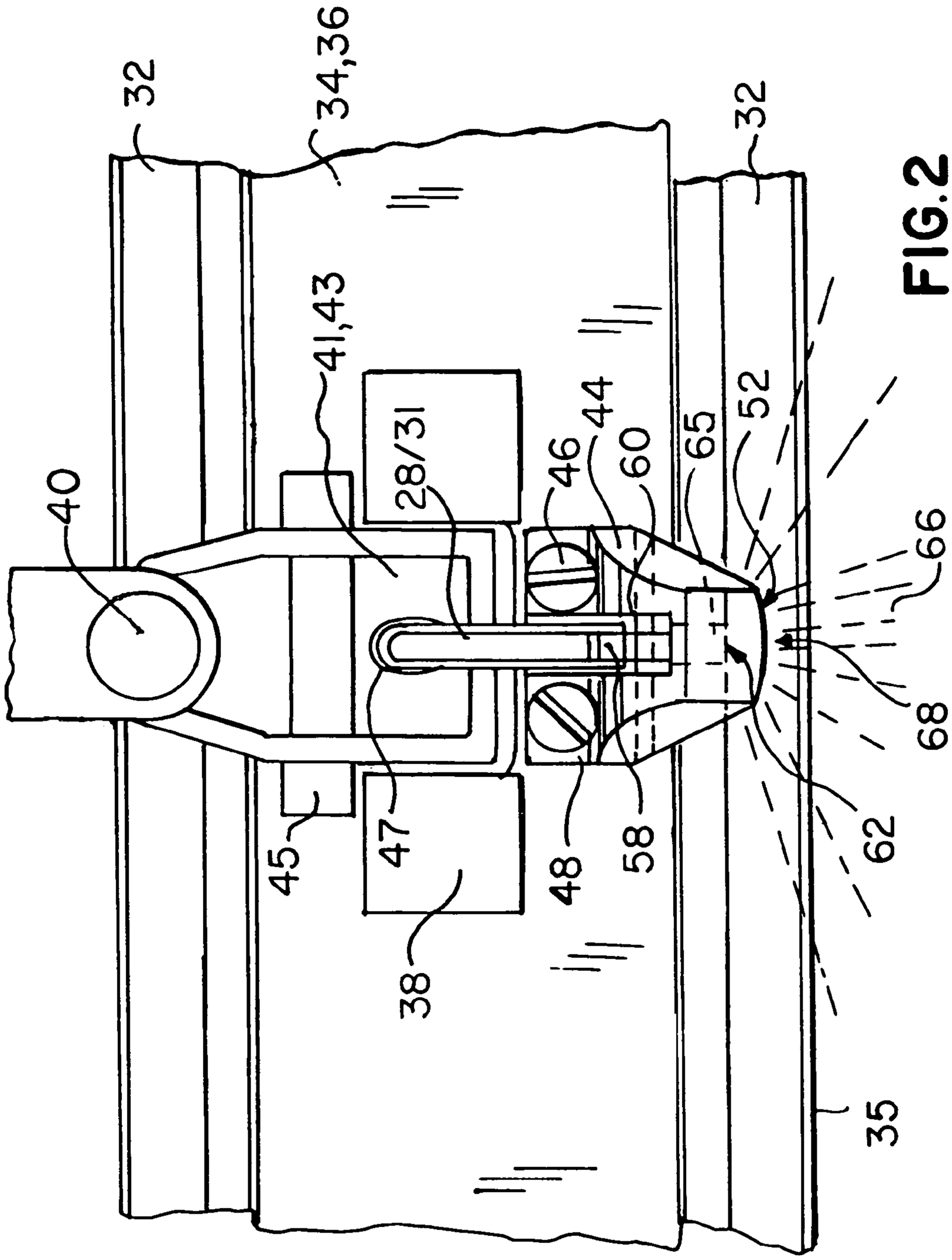

FIG.2

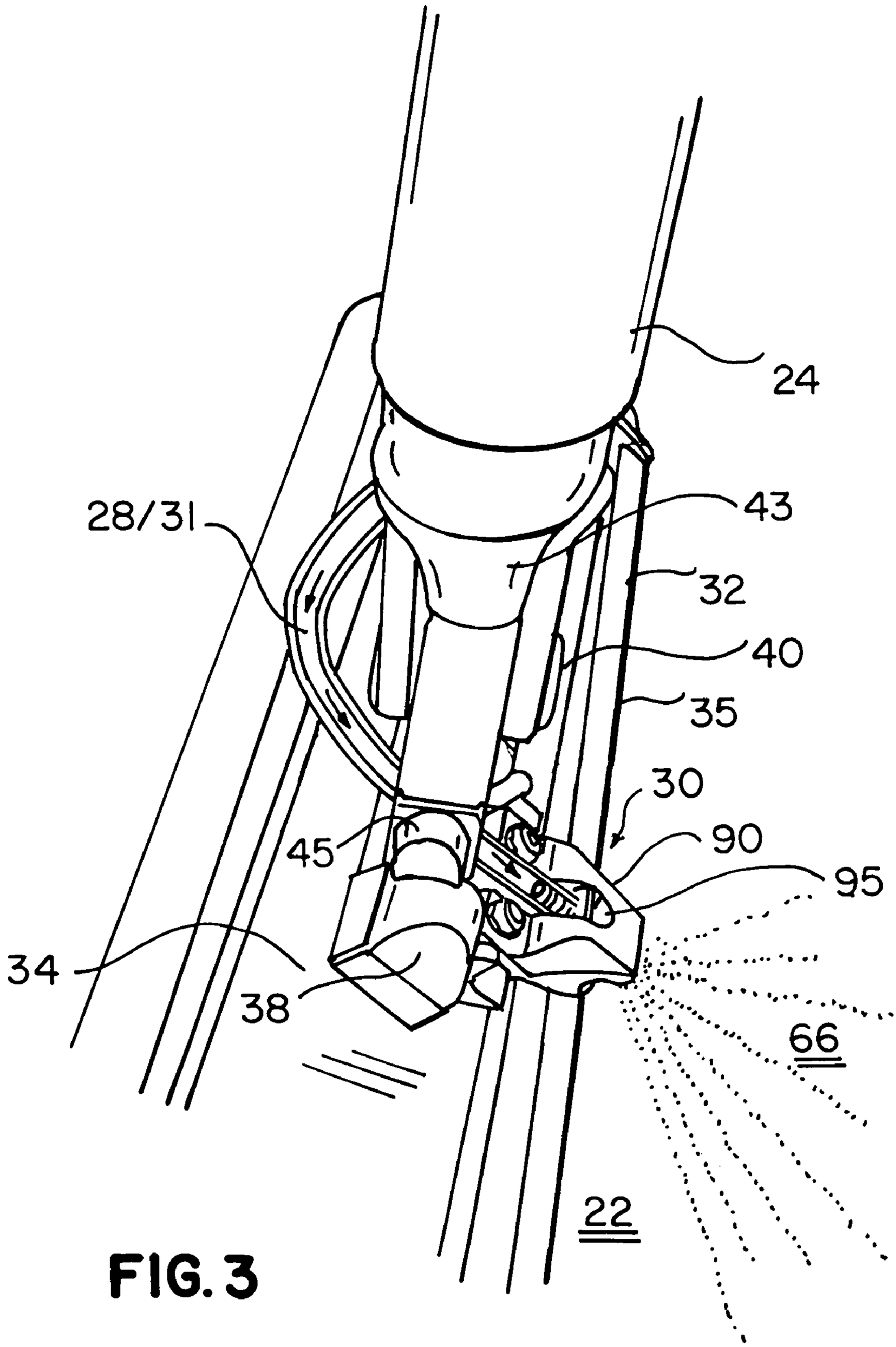

FIG. 3

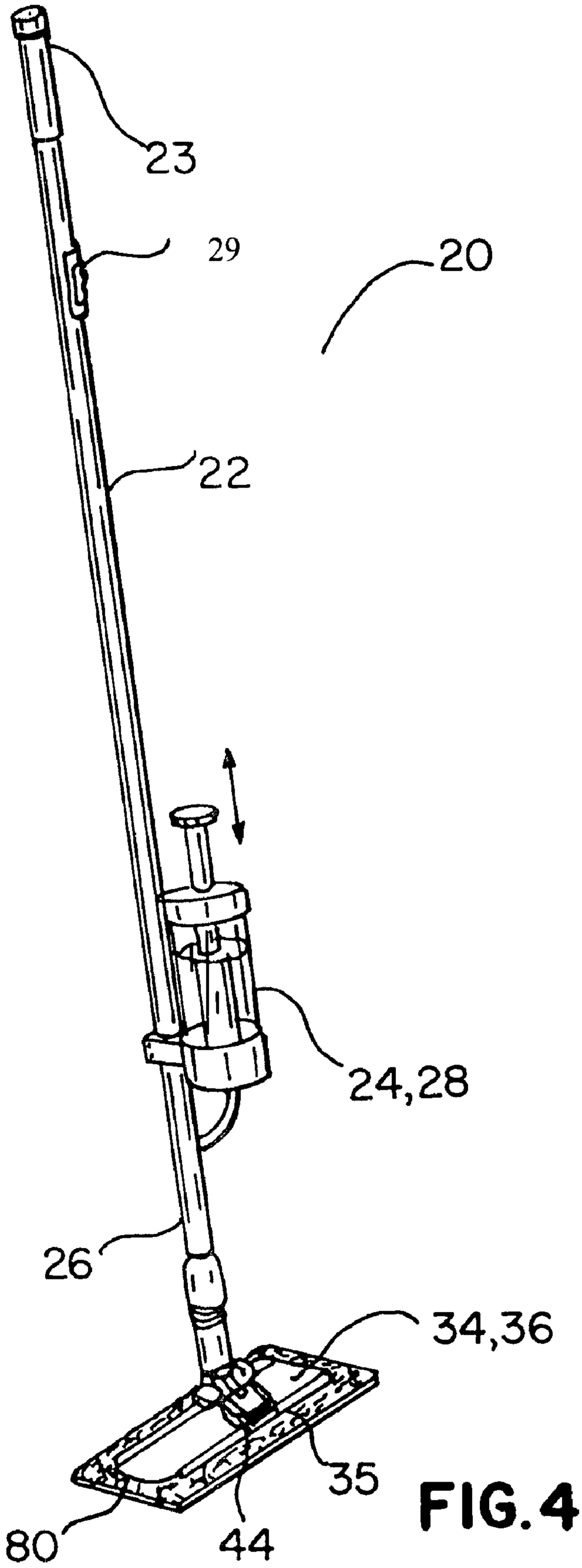

FIG.4

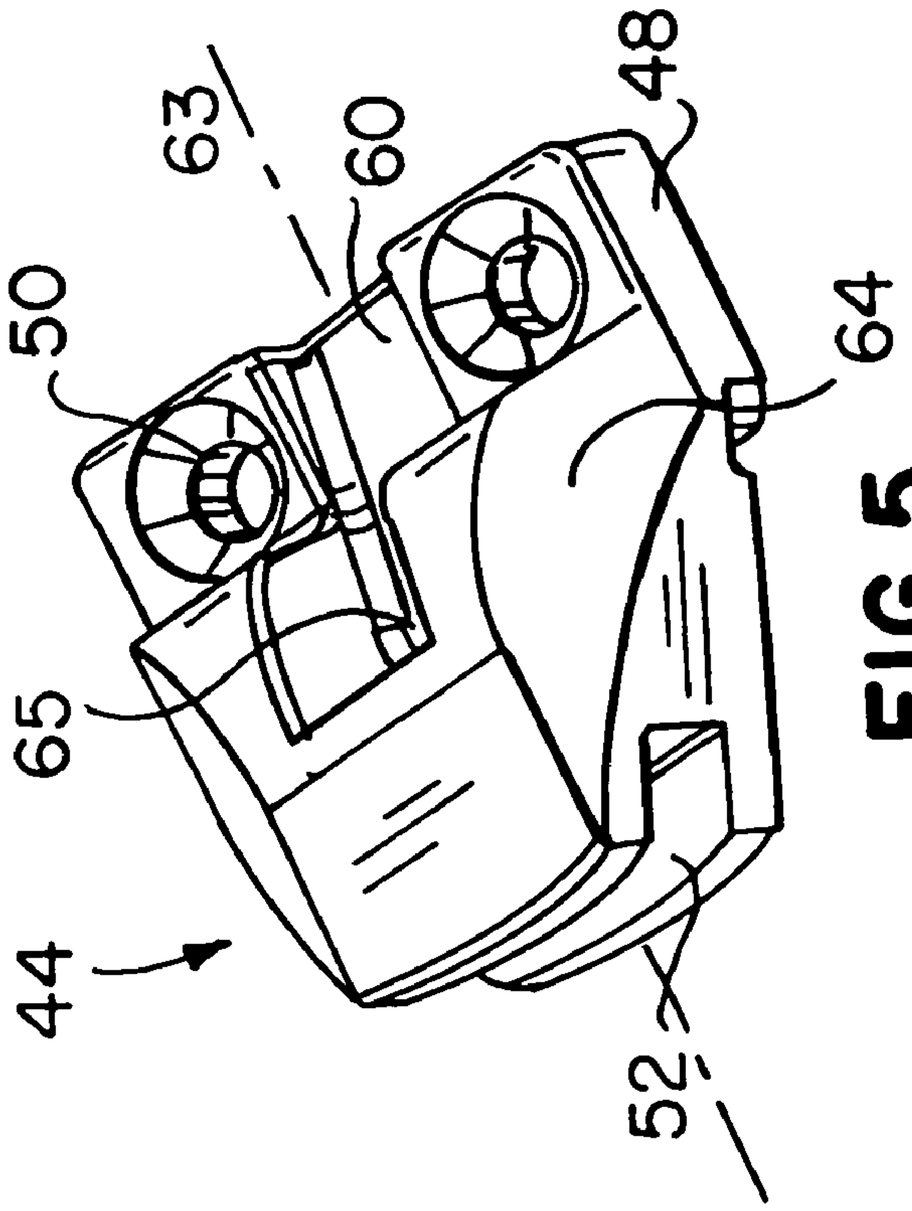

FIG. 5

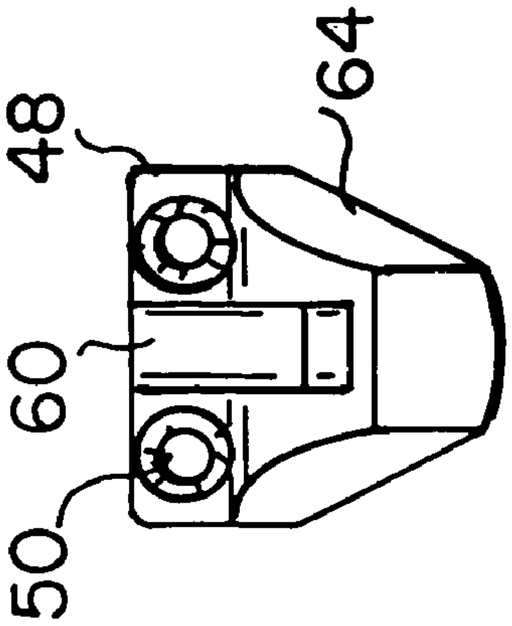

FIG. 5A

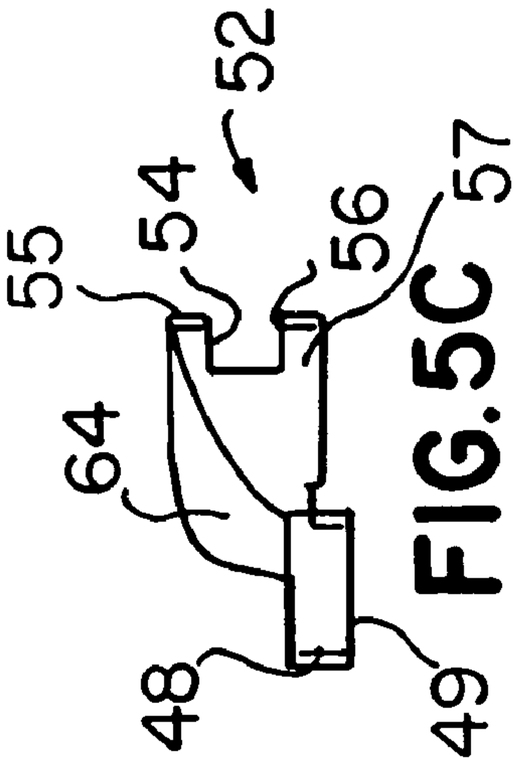

FIG. 5C

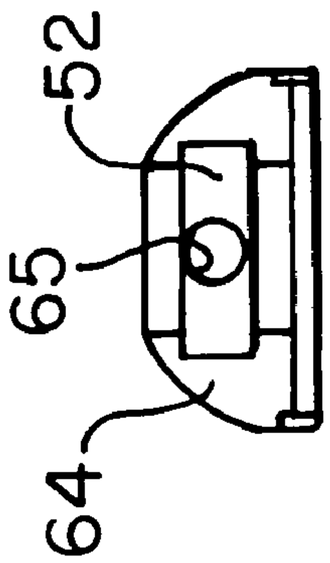

FIG. 5B

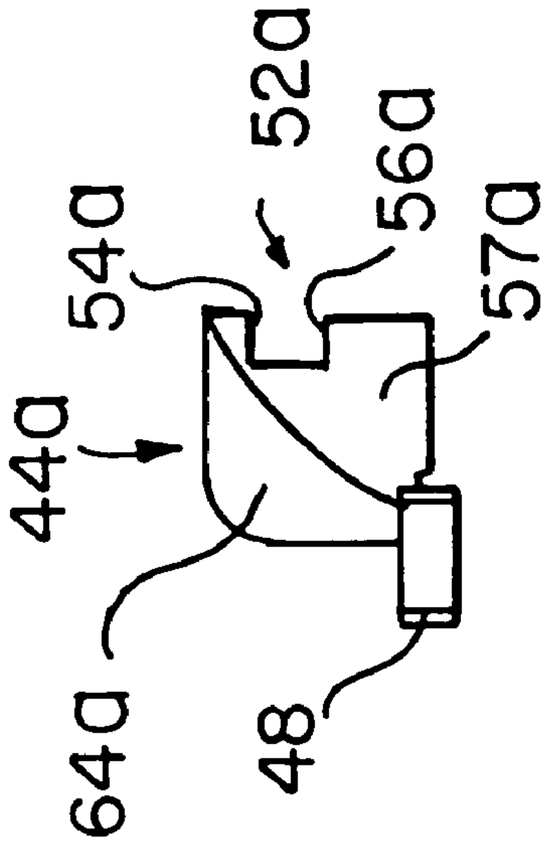

FIG. 7

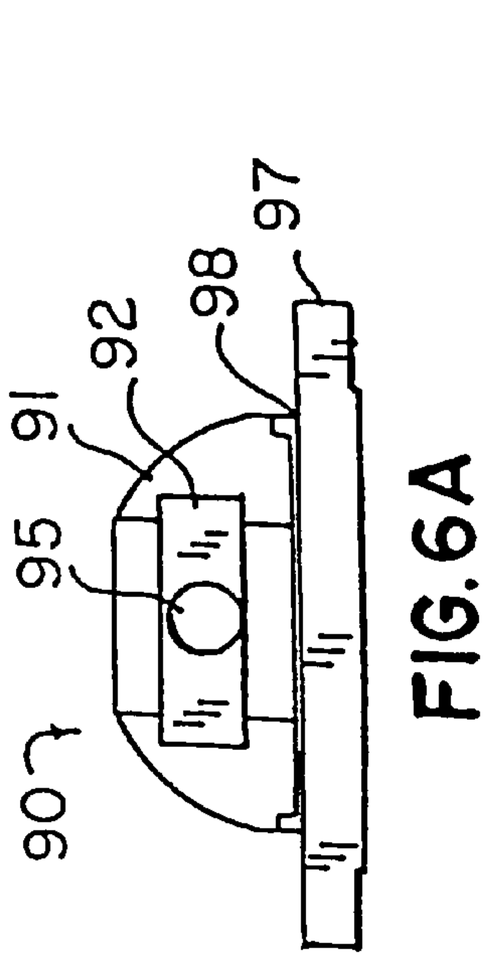

FIG.6A

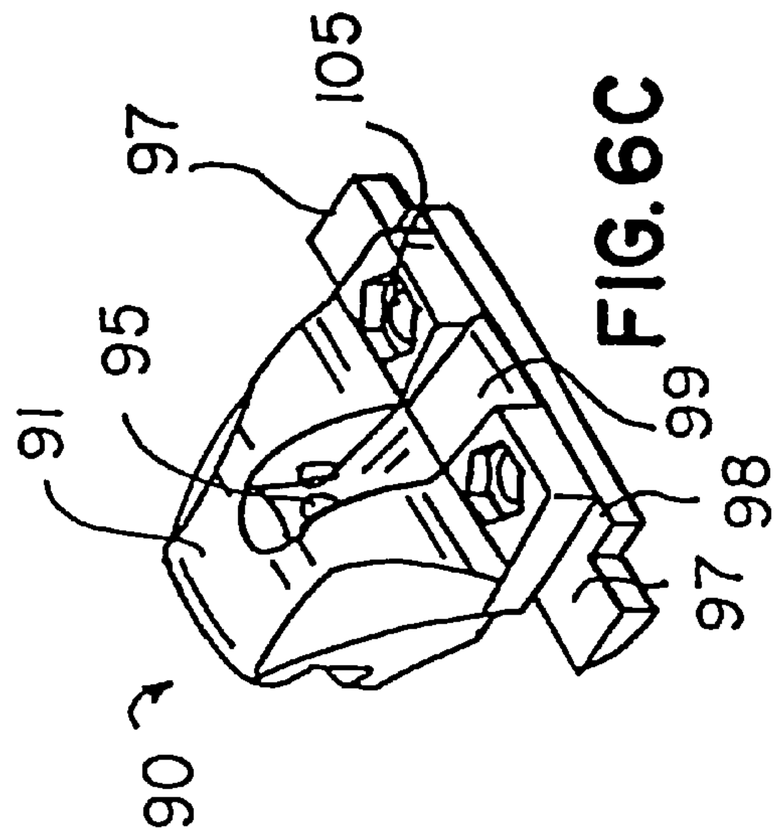

FIG.6C

FIG.6B

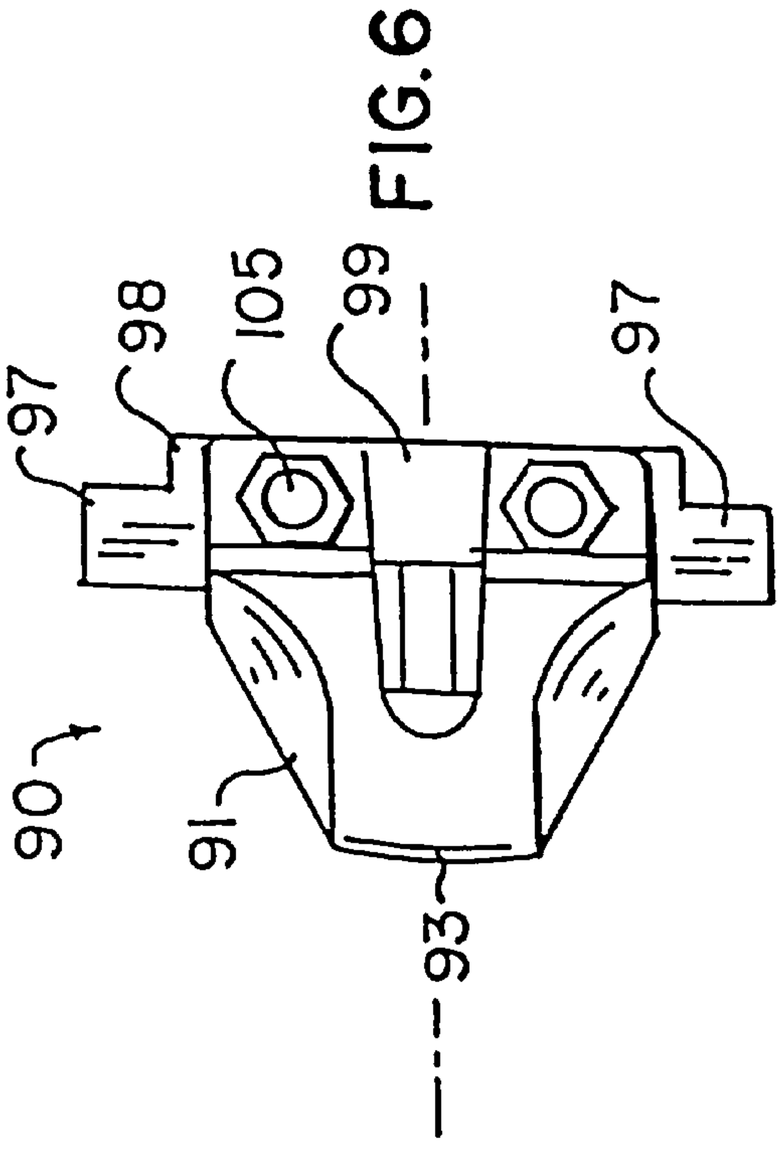

FIG.6

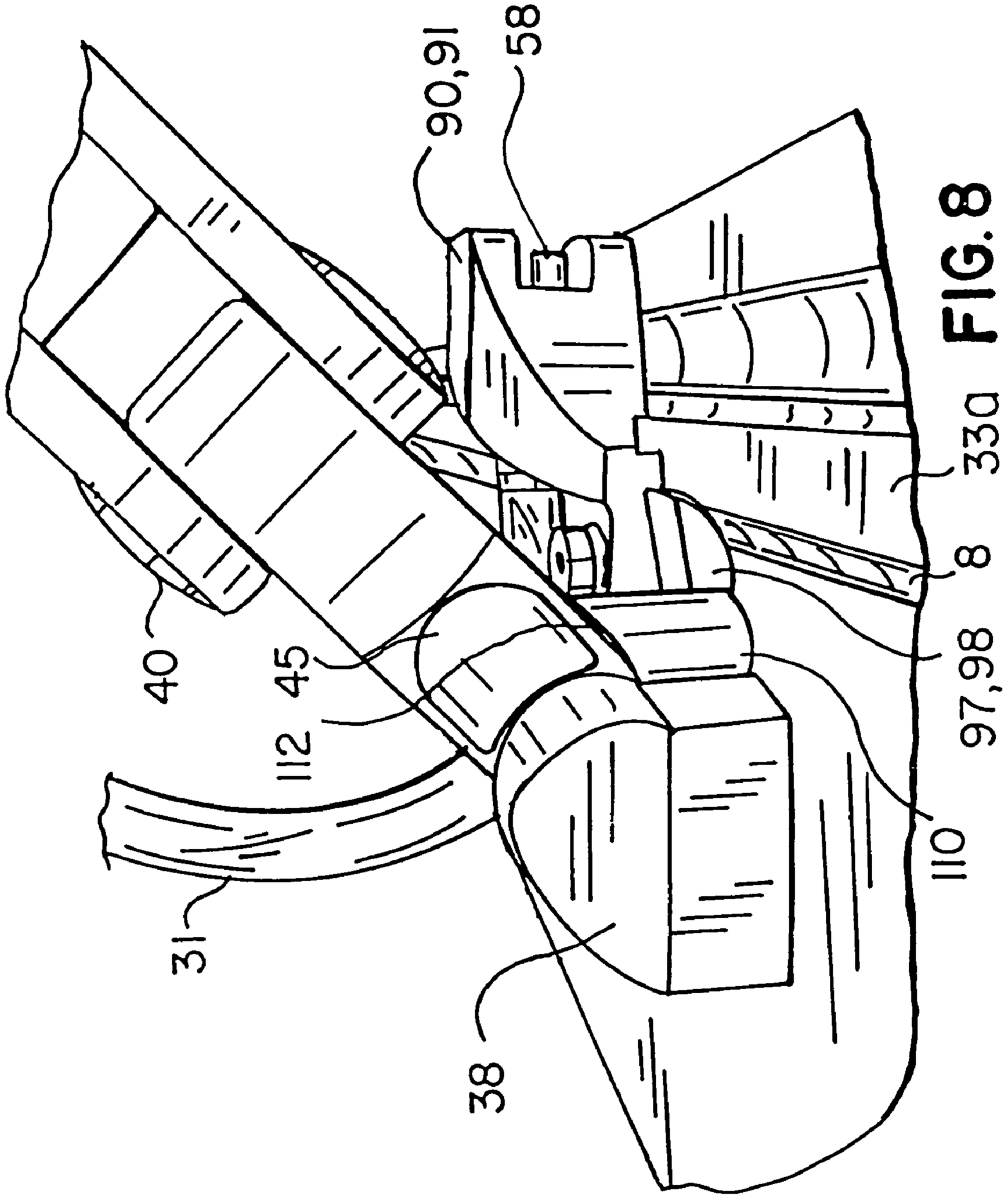

FIG. 8

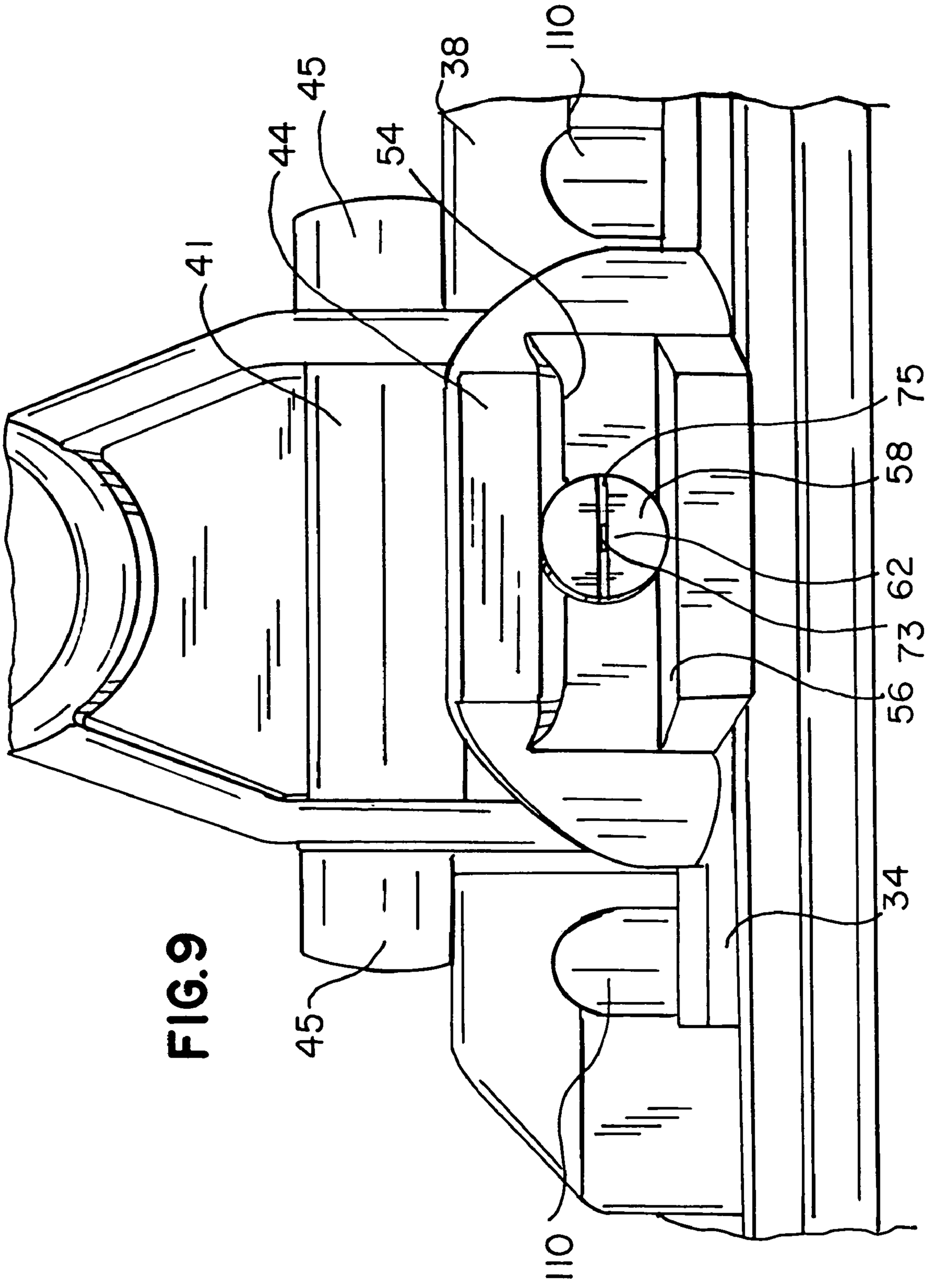

FIG.9

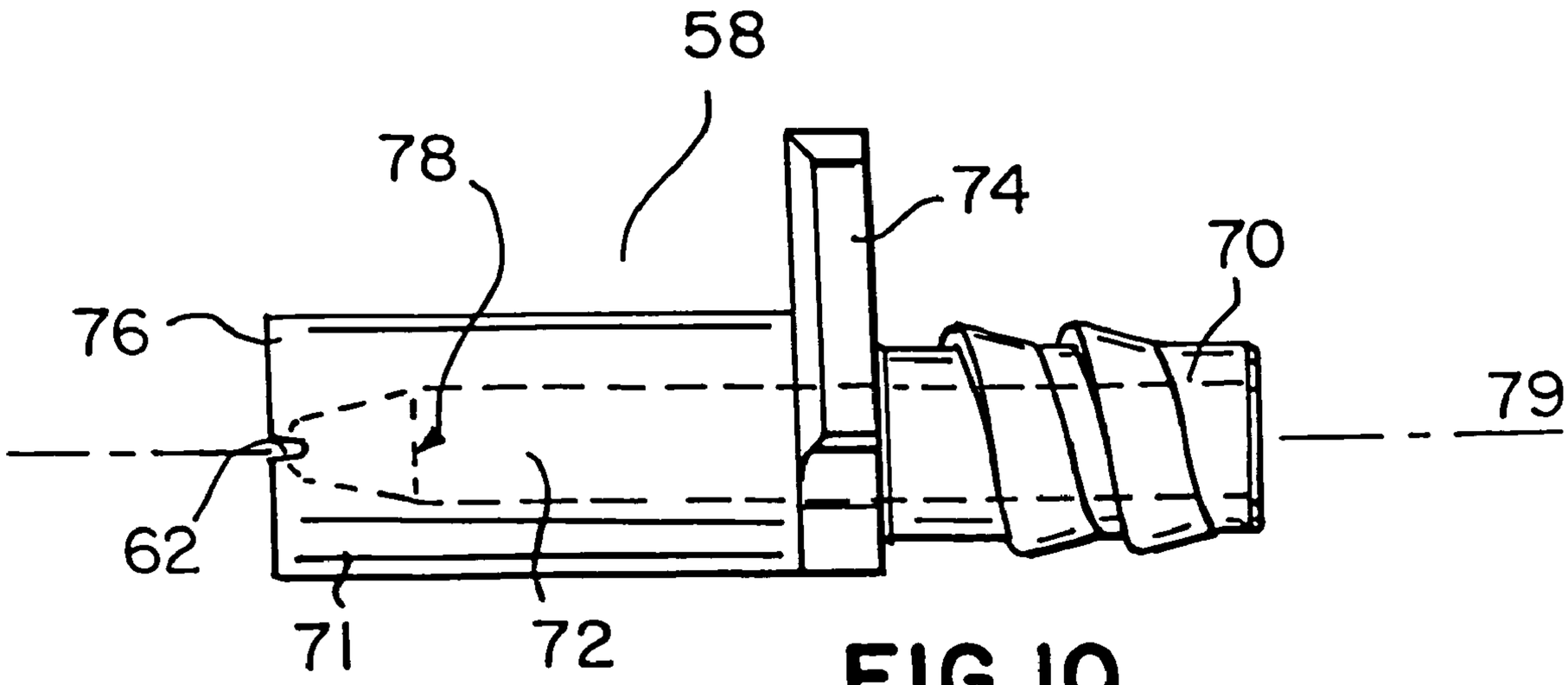

FIG. 10

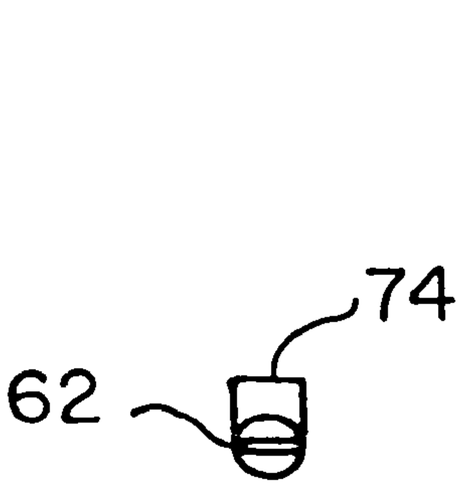

FIG. 11

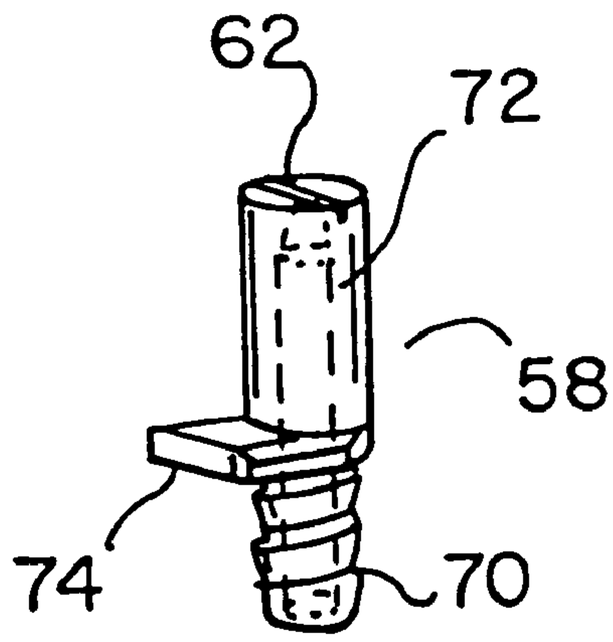

FIG. 12

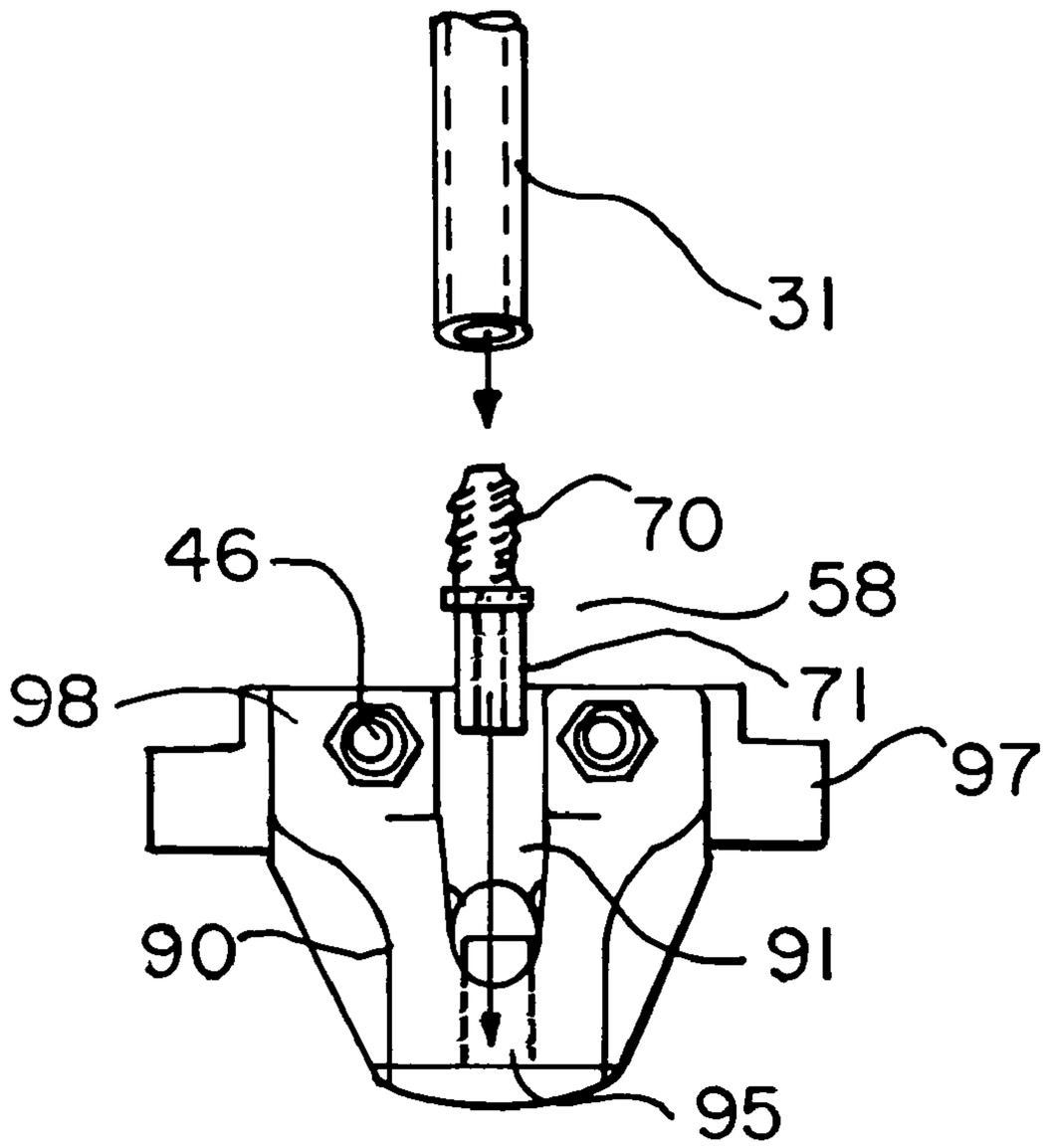

FIG. 13

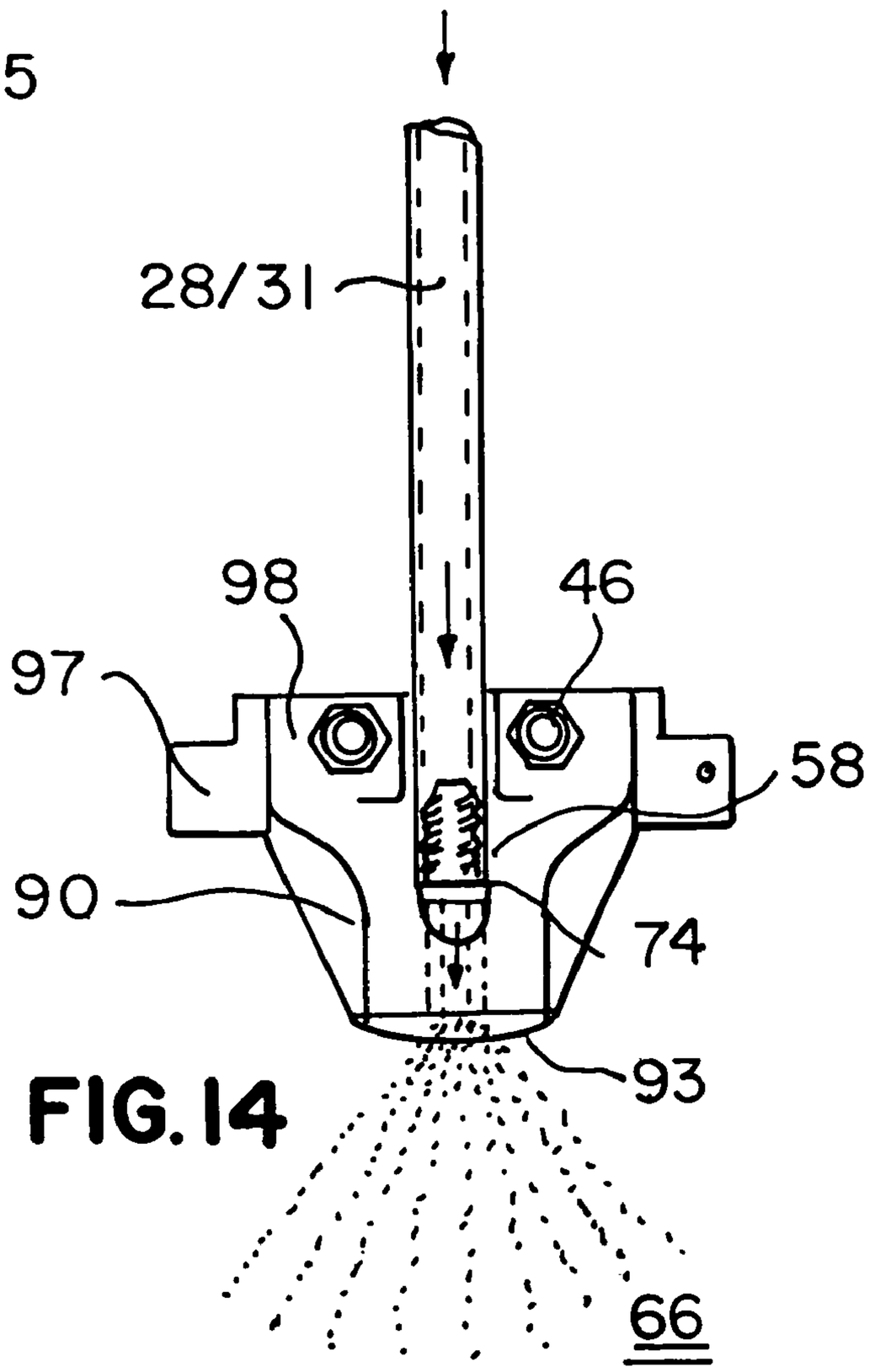

FIG. 14

CLEANING DEVICE

CROSS REFERENCE TO RELATED APPLICATION

This application claims foreign priority benefits under 35 USC §119(a)-(d) or §365(b) of German Utility Model No. 20 2005 004 060.6, filed on Mar. 14, 2005. This application is also a Continuation-in-part of patent application Ser. No. 11/359,717, filed on Feb. 22, 2006, which is incorporated by reference herein in its entirety.

FIELD OF INVENTION

The present invention relates to a cleaning device, or flat mop, with a retaining plate serving as a carrier for cleaning cloths, mops, and similar cleaning elements, which is connected with a rod or similar handling device, as well as with a flat jet spray assembly attached to the retaining plate for the emission of cleaning fluid.

BACKGROUND OF INVENTION

Cleaning devices are already known which, by means of an emission device, emit cleaning fluid out of an outlet aperture onto the area of the floor located in front of the retaining plate. With a cleaning cloth arranged at the retaining plate, the cleaning fluid, which can also contain a disinfectant fluid or is such a fluid, can be distributed onto the floor (DE 100 40 014 A1). The flat surface distribution of the cleaning fluid emerging from the outlet aperture, however, still requires substantial expenditure of time and labor.

A cleaning device is therefore also known from DE 102 29 327 A1 which has a fluid outlet which is designed as a spray strip, which has several outlet apertures distributed over the longitudinal extension of the strip. As a result of this, the cleaning fluid can be applied in linear fashion, and the effort required for distributing the cleaning fluid can be reduced. The spray strip is arranged close to the floor, on at least one longitudinal edge of the retaining plate, and therefore close to the cleaning area, with the result that the risk pertains of the outlet apertures of the spray strip rapidly becoming dirty, and replacement or cleaning becoming necessary. In addition, the spray strip extending beyond the spray area may become damaged in the course of its longitudinal extension during the use of the cleaning device, for example under low items of furniture or in the area of other obstacles, so that a uniform distribution of the cleaning fluid is impaired.

Generic cleaning systems of the type in which the present invention spray head assembly may be used appear in U.S. Pat. No. 6,986,618 to Hall, et al. Flat jet nozzles are also known in the art, however, primarily for use in high pressure cleaning of stone and other dense surfaces of building exteriors. This is reflected in U.S. Pat. No. 4,307,840 to Schulze; U.S. Pat. No. 5,037,032 to Graef; U.S. Pat. No. 5,597,122 to Eisenmann; and U.S. Pat. No. 5,833,148 to Steinhilber. No art comparable in structure or function to the present assembly is known to the inventor.

A need therefore exists for a cleaning device of the type referred to with which the application and distribution of cleaning fluid can be carried out in a time-saving and convenient manner, which can be manufactured with little effort, can be easily fitted, and can also be used in confined spaces with obstacles and in severely dirt-contaminated areas which are to be cleaned.

SUMMARY OF THE INVENTION

In one embodiment, the present invention is directed to a flat jet spray assembly for providing a flat jet spray on a flat mop. The flat jet spray assembly comprises a spray head comprising a securing flange at a rear portion thereof; and a front portion having a slot-shaped spray jet outlet being open at side edges and a channel around a center of, and in perpendicular to, the slot-shaped spray jet outlet; a spray nozzle having a horizontal emission slit; the spray nozzle disposed within the channel of the spray head; and a fluid feed tubing having an outlet connecting to the spray nozzle, and having an inlet connecting to a fluid supplier. The flat jet spray assembly is secured upon an upper surface of a flat mop head. The securing flange of the spray head can an inclined base, and the angle between the inclined base and the horizontal ground can be used to control spray width of the flat jet spray assembly.

In a further embodiment, the present invention is directed to a cleaning device, which comprises a support shaft; a retaining plate connected to a distal end of the support shaft by pivot means; a cleaning pad detachably secured to a lower surface of the retaining plate; a fluid reservoir attached to the support shaft, for storing cleaning fluid; and the flat jet spray assembly as described above, secured upon the upper surface of the retaining plate within a perimeter thereof.

It is an object of the invention to provide a cleaning device by which the application and distribution of cleaning fluid can be carried out in a time-saving and convenient manner, which can be conveniently manufactured and can be easily fitted, and can also be used in confined spaces with obstacles and in severely dirt-contaminated areas which are to be cleaned.

The above and yet other objects and advantages of the present invention will become apparent from the hereinafter set forth Brief Description of the Drawings, Detailed Description of the Invention, and Claims appended herewith.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a top operational view of a distal end of a flat mop with which the inventive flat jet spray assembly is employed.

FIG. **2** is a top view of the flat jet spray assembly, retaining plate and the pivot means of one embodiment of the present invention.

FIG. **3** is a diagonal view of FIG. **1** showing in greater detail the passage of fluid from the fluid reservoir to the spray nozzle of the flat jet spray assembly.

FIG. **4** is a schematic view of the flat mop of the present invention.

FIG. **5** is a perspective view of the spray head in one embodiment of the present invention. FIGS. **5**A-**5**C are a top elevational view, a front plan view and a side elevational view of the spray head of FIG. **5**, respectively.

FIGS. **6**-**6**C are a top elevational view, a front plan view, a side elevational view and a perspective view, respectively, of the spray head of one embodiment of the present invention.

FIG. **7** is a view, similar to that of FIG. **5**C, however showing that the lower front portion of the spray head can be provided with an enhanced vertical dimension.

FIG. **8** is a side view of flat jet spray assembly installed on the retaining plate showing the interface between the securing flange of the spray head and the front rim of retaining plate.

FIG. **9** is a front elevational view of the flat jet spray assembly of FIGS. **1-3**, particularly showing the geometry of the horizontal emission slit of the spray nozzle and the position of the front of the spray nozzle within the slot-shaped spray jet outlet of the spray head.

FIG. **10** is a side elevational view of the spray nozzle of flat jet spray assembly of the present invention.

FIG. **11** is a front view of the spray nozzle of FIG. **10**.

FIG. **12** is a rotated side elevational view of the spray nozzle of FIG. **10**.

FIGS. **13** and **14** are sequential views showing the attachment of the spray nozzle to the fluid feed tubing and the fluid pathway of the spray nozzle.

DETAILED DESCRIPTION OF THE INVENTION

In one embodiment, the present invention provides a cleaning device, more particularly a flat mop. As shown in FIGS. **1-3** and **4**, flat mop **20** comprises a support shaft **22**, a retaining plate **34** connected to a distal end **26** of support shaft **20** by pivot means; a cleaning pad **80** detachably secured to a lower surface of retaining plate **34**; a fluid reservoir **24** attached to support shaft **22** for holding fluid **28**; and a flat jet spray assembly **30** secured upon upper surface **36** of retaining plate **34**. Retaining plate **34** is also commonly referred to as flat mophead.

Further shown by FIGS. **1-3** is the connection mechanism between retaining plate **34** and support shaft **22**, which includes a retaining element **38**, a vertical pivot joint **41**. retained by retaining element **38**, a horizontal pivot joint **40** connected to the upper portion of vertical pivot joint **36**, and a shaft mount **43** connected to upper portion **42** of horizontal pivot joint **40**. Distal end **26** of support shaft **22** is secured into shaft mount **43**. As shown in FIG. **4**, a flat cleaning pad **80** is attached to the lower surface of retaining plate **34**. Preferably, cleaning pad **80** is made of microfiber which can be washed for more than **300** times. In one embodiment, a layer of loop material is sewed on the upper side of cleaning pad **80**; and there is a strip of hook material secured along the bottom side of each edge strip **32**. Cleaning pad **80** is detachably attached to the lower surface of retaining plate **34** by a hook-loop connection. Reservoir **24** can include a manual pump, or mechanical pump, which can be activated by switch **29** adjacent to proximal end **23** of support shaft **22**.

Flat jet spray assembly **30** comprises a spray head **44** or **90**, a spray nozzle **58** disposed within the spray head and a fluid feed tubing **31** fluidly connecting spray nozzle **58** and fluid reservoir **24**.

As shown in FIGS. **1-3**, spray head **44** or **90**, approximately central in the longitudinal extension of retaining plate **34**, is arranged in front of retaining element **38** and inside the outline contour or perimeter of retaining plate **34**. The width of spray head can be of equal width or narrower than retaining element **38**. Because of this arrangement, and also due to the small dimensions of the spray head, this is well protected against damage. The spray head can, for example, have external dimensions with a width of about 30 mm, a depth of about 30 mm, and a height of about 15 mm. Preferably, the width of spray head **44** or **90** is substantially less than the width of retaining element **38**. When the cleaning pad is attached, the front end **55** or **93** of spray head **44** or **90**, respectively, in the direction of spraying, is at a distance from the front edge of cleaning pad **80**, for example 1.0 to 2.5 cm. This distance substantially reduces the dirt contamination of spray nozzle **58**. As shown in FIGS. **5** and **6**B, spray head **44** or **90** can be designed as a plate-shaped flat part. Therefore, the spray head does not project forward or upward in an interfering manner at any point, with the result that it is well protected against damage and functional disturbances are avoided. Due to the structure and arrangement of the spray head, problem-free cleaning under low items of furniture is also practical.

As can be appreciated from FIGS. **1** and **8**, retaining plate **34** has front and back enforcement rims **33***a* and **33***b*, respectively, which extend along the longitudinal extension of retaining plate **34** and slightly protrude upwardly from upper surface **36** of retaining plate **34**. The front enforcement rim **33***a* is underneath the front portion **91** and in front of securing flange **98** of spray head **90**. Retaining element **38** is positioned transversely about the middle between enforcement rims **33***a* and **33***b*. Retaining element **38** are two separated symmetrical parts having semi-circular upper portions. In a preferred embodiment, as shown in FIGS. **1**, **2** and **8**, in front of retaining element **38** there is a stopping element in the form of a pair of stoppers **110**, each having an inclined upper end **112**, inclined toward retaining element **38**. As shown in FIGS. **2**, **8** and **9**, vertical pivot joint **41** has a center piece **43** and a pair of positioning flanges **45** protruding on the left and right sides of center piece **43**. There is an opening **47** around the center near the bottom of center piece **43** for fluid feed tubing **31** to pass through (see FIG. **2**). As shown in FIG. **8**, when support shaft **22** is severely titled toward the front edge **35** of retaining plate **34**, positioning flanges **45** of the vertical pivot joint **41** can be stopped by stoppers **110**. This serves two functions. The stoppers **110** prevent the pivot joints to lean against spray head **90** when support shaft **22** is extensively tilted, and hence cause damage to the spray head. This also prevents severe bending of fluid feed tubing **31** and its consequential discontinuing supply of the cleaning fluid, which occurs when support shaft **22** is extensively tilted. It is noted that for the purpose of the present invention other suitable shapes or structures can also be used for the stopping element.

As shown in FIGS. **5** through **5**C and **9**, spray head **44** of one embodiment of the present invention has a securing flange **48** at a rear portion thereof, and a front portion **64** extending upward and forward from securing flange **48**. Front portion **64** has a slot-shaped spray jet outlet **52**, being open at the side edges, and having a rectangular, or U-shaped vertical cross-section. Slot-shaped spray jet outlet **52** has upper and lower surfaces **54** and **56**, which are substantially parallel to each other. Furthermore, in approximately the middle of the slot longitudinal extension there is a channel, or through nozzle hole **65**, for holding spray nozzle **58**. Securing flange **48** has a pair of fastening openings **50** for attaching spray head **44** to retaining plate **34** by securing screws **46**. Instead of threaded screws, in this case bayonet-type connections can also be provided for the rapid fitting and removal of spray head **44**. Along the transverse axis **63** of spray head **44**, which is in perpendicular to the longitudinal extension of slot-shaped spray jet outlet **52**, there is a cut-out on the upper side, forming a planar mounting seat **60** for seating fluid feed tubing **31** and its connection interface with spray nozzle **58**. As shown in FIG. **5**C, base **49** of securing flange **48** is substantially planar.

FIGS. **6** through **6**C show the structure of spray head **90** in an alternative embodiment of the present invention. The structures of front portion **91** of spray head **90**, including slot-shaped spray jet outlet **92** and its parallel upper and lower surfaces **94** and **96**, and channel **95**, as well as mounting seat **99** on the upper side of spray head **90** are the same as those of the corresponding components of spray head **44** described above. As shown, securing flange **98** of spray head **90** has extension portions **97** on both sides. When being installed, extension portions **97** are positioned directly against the pair of stoppers **110** in front of retaining element **38**. As such,

spray head **90** will not be dislocated, for example tilted left or right, when it is hit by obstacles from either side of the spray head during cleaning. Securing flange **98** has a pair of openings **105** for fastening spray head **90** to retaining plate **34**.

As an important structural feature of spray head **90**, extended securing flange **98** has an inclined base **100**. As shown in FIG. **6**B, from rear face **104** of securing flange **98**, base **100** curves upwardly toward the front of spray head **90**. There is an upward angle (β) between the horizontal ground to the inclined base **100**, in a range between about 4 and about 10 degrees. It is noted that as the upper surface **36** of retaining plate **34** is substantially flat, the angle (β) can also be referred to the angle of the inclined base **100** relative to the upper surface of retaining plate **34**, or other flat mophead. When being installed on retaining plate **34**, inclined base **100** is positioned on upper surface **36** of retaining plate **34**, with its curved front portion **102** against the rear portion of front enforcement rim **33***a*. In the embodiment shown, see FIG. **8**, rear portion **8** of front enforcement rim **33***a* is curved, which is complementary to the curved front portion **102** of inclined base **100**, and hence forming a stable interface. The degree of angle β controls the spray width of flat jet spray assembly **30**, as further described in detail hereinafter.

The structure and geometry of spray nozzle **58** may be more fully appreciated with reference to the views of FIGS. **9** and **10-13**. As shown, spray nozzle **58** includes hollow body **71**, through-channel **72**, horizontal emission slit **62**, locking flange **74** and tubing connection section **70**. FIG. **10** shows the interior geometry of the through channel **72** by which cleaning fluid reaches horizontal nozzle aperture **73**. That is, through channel **72** may be a right cylinder until plane **78** is reached. Thereafter, the through channel conically narrows into nozzle aperture **73** having the geometry shown in FIGS. **9-11**. Horizontal emission slit **62** is formed by a central horizontal nozzle aperture **73**, which is the opening of through-channel **72** on front face **76** of spray nozzle **58**, and a horizontal slit **75** on front face **76** extending from nozzle aperture **73** through the entire width of front face **76**, and opening on both side edges of front face **76**, as shown in FIG. **9**. Spray generated from horizontal emission slit **62** is in a fan shape, being flat in height. In the embodiment shown, horizontal emission slit **62** is aligned with longitudinal axis **79** of spray nozzle **58**. However, an angle between horizontal emission slit **62** and longitudinal axis **79** can be provided for adjusting the direction and width of the spray. For example, by providing a positive angle between horizontal emission slit **62** and longitudinal axis **79**, the spray is ejected with an upward angle, and the spray width generated on the floor is increased.

Locking flange **74** projects transversely from a longitudinal axis **79** of spray nozzle **58**, which facilitates insertion of spray nozzle **58** into fluid feed tubing **31** and also assures proper positioning spray nozzle **58** within spray head **44**. The location of lock flange **74** relative to front face **76** of spray nozzle **58** also assures precision in the axial location of spray nozzle **58** within channel **65**, this as can be appreciated with reference to FIG. **14**. In other words, in the absence of a means such as lock flange **74**, an operator might inadvertently dispose spray nozzle either too far forward, or too far back relative to front end **55** of spray head **44**, thereby undesirably affecting the dispersion pattern of the fluid and thus of the function of flat jet spray assembly **30**.

Spray nozzle **58** is inserted into channel **65** from mounting seat **60** with lock flange **74** facing upward and horizontal emission slit **62** in horizontal position in parallel to slot-shaped spray jet outlet **52**. FIG. **9** shows an enlarged front view of spray head **44** with spray nozzle **58** within slot-shaped spray jet outlet **52**. The upper and lower surfaces **54** and **56** are above and below, and in parallel with horizontal emission slit **62** of spray nozzle **58**. After installed in spray head **44**, front face **76** of spray nozzle **58** is positioned with a distance, for example, 2 to 3 mm, inwardly from front face **55** of spray head **44**. Therefore, spray nozzle **58** is protected at all directions by spray head **44**, and the physical contacts with obstacles at the front face **55** of spray head during cleaning will not cause damage of spray nozzle **58**. Moreover, the upper and lower surfaces **54** and **56** of slot-shaped spray jet outlet **52** further assures that spray **66** from spray nozzle **58** is substantially flat and projects only forward and laterally (left and right) of spray head **44**. It is noted that the structural relationship between spray nozzle **58** and the spray head is described above using spray head **44**, however, this relationship is the same with spray head **90**.

The outlet of fluid feed tubing **31** is connected to tubing connection section **70** of spray nozzle **58**, the interface between fluid feed tubing **31** and spray nozzle **58** is seated on mounting seat **60**. Fluid feed tubing **31** has an inlet connecting to fluid reservoir **24**, and it fluidly communicates between fluid reservoir **24** and spray nozzle **58**, as shown in FIGS. **3**, **13** and **14**.

In the embodiment shown, spray nozzle **44**, or **90** is designed as a flat jet spray nozzle with a horizontal emission slit. In an alternative embodiment, the spray nozzle can be designed as a fan nozzle, and can have several jet outlets arranged at angles to one another. With each embodiment, widely diverging spray jets can be created which, at short distance, not only contact a sufficiently wide area of the floor in front of the retaining plate, but in the manner desired also create a flat, i.e., narrow in height spray jet. This is of major significance, because, as a result, specifically only an area close to the retaining plate can be wetted, and undesirable wetting of furniture of the like located beyond the cleaning area will be avoided.

Commonly used flat mops have three sizes, 22, 16 and 11 inches, in terms of the width of the mophead. The 22 and 16 inch flat mops are commonly used in commercial and residential cleaning, and the 11 inch flat mop is used for cleaning narrow areas. In commercial and industrial cleaning, about 32 inch flat mop is also used. Depending on the width of a retaining plate to be used, the width of spray generated by flat jet spray assembly **30** of the present invention can be adjusted between about 20 cm and about 80 cm, which match the width of the mophead. The extent of forward and lateral dispersion of the emissions of horizontal emission slit **62** of spray nozzle **58** can be found to be a function of several variables, namely, the angulation of spray head **44**, or **90** relative to surface **22** to be cleaned, the height of spray nozzle **58** above cleaning surface **22**, and rearward offset **68** (see FIG. **2**) of the spray head from front edge **35** of retaining plate **34**. For example, if slot-shaped spray jet outlet **52** of spray head **44** is tilted slightly downward, e.g. 2 degrees, relative to floor, the extent of both outward and lateral dispersion will be less than is the case if slot-shaped spray jet outlet **52** is completely parallel with the floor. Furthermore, if the height of the principal axis of horizontal emission slit **62** is increased relative to the floor, the outward and lateral extent of spray emission **66** is increased. In other word, the trajectory of the spray jet may be changed by either tilting slot-shaped spray jet outlet **52** slightly upwardly or downwardly or by increasing the height of the horizontal emission slit **62** relative to the floor. Change of trajectory and extent of lateral dispersion may also be accomplished by using spray head **44***a* of FIG. **7**. In FIG. **7**, lower jaw portion **57***a* exhibits a larger vertical dimension

than that of portion **57** of FIG. **5**C, thus elevating slot-shaped spray jet outlet **52***a* and spray nozzle **58**, generating a wider spray width on the floor.

In a preferred embodiment, the spray width is controlled by using a spray head having an inclined base of the securing flange, such as the structure illustrated by spray head **90** shown in FIGS. **6**B and **5**C. As stated previously, the degree of angle β controls the spray width generated by the flat jet spray assembly. As angle β increases, slot-shaped spray jet outlet **92** of spray head 90 titles upward, which increases the spray width in front of the retaining plate. As angle β decreases, the spray width is narrowed. It has been found that by varying angle β between 5 and 9 degrees, the spray width can be controlled between 20 cm and 80 cm, which correspond to the width of flat mops from 11 inch to 32 inch. Therefore, a slight upward angulation of the slot-shaped spray jet outlet considerably increases outer and lateral dispersion, conversely, a slight downward angulation of spray head **90** considerably narrows the projection and lateral dispersion of the spray width. To this purpose, several spray heads **90** can be provided, each having a specific angle β. The user can select an appropriate spray head according to the width of the mophead. As can be appreciated, one uniform structure of spray nozzle **58**, can be fitted to multiple spray heads.

Furthermore, the change of angulation can also be achieved by providing a shim-like insert underneath the spray head. The thickness, location, and direction of the insert, for example, provided underneath the front portion of the spray head, verses underneath the securing flange, will control the broadening or narrowing of the spray width. Furthermore, shim-like adjustment element can also be provided on the upper surface of the retaining plate, such as in front of the retaining element for the pivot means, as an integrated component of the retaining plate. In this configuration, the angulation is controlled by the shim-like adjustment element, and one uniform spray head can be used with different retaining plates which have different angle or height of the shim-like adjustment element.

In a further embodiment, the spray width can be adjusted by changing the angle of horizontal emission slit **62** to longitudinal axis **79** of spray nozzle **58**, as described hereinabove. Therefore, as a different spray width is desired, the user can replace one spray nozzle with another which has a different angle between the emission slit and the longitudinal axis **79** of spray nozzle **58**. To this purpose, several optionally usable spray nozzles can be provided for preference with spray widths of between about 20 cm and about 80 cm.

It should be understood that although the flat jet spray assembly of the present invention as described above have the spray head and the spray nozzle as two separate components, these components can also be made into one integrated structure, for example, by plastic molding. Furthermore, the spray head, spray nozzle and retaining plate can also be made into one integrated structure.

Using the above described approaches, adjustment to retaining plates of different widths can easily be achieved and the spray jet emerges onto the floor approximately in the width of the retaining plate, and is therefore already well distributed onto the surface so that further distribution of the cleaning fluid requires comparatively little effort.

Furthermore, because the spray head is secured to retaining plate **34** of flat mop **20**, and is therefore arranged comparatively close to the ground, the excessive swirling of aerosols of the cleaning fluid is avoided, which can even lead to allergic reactions and the impairment of the health of the user. Furthermore, potential activity loss of the disinfection agents in air is also minimized.

It can be appreciated by those skilled in the art that although the flat jet spray assembly of the present invention has been described herein in detail using the structure of flat mop **20**, the flat jet spray assembly can be used with other flat mops by installing the instant assembly on the upper side of the flat mophead, and connecting the fluid feed tubing to a available cleaning fluid reservoir or other suitable fluid supplier.

While there has been shown and described the preferred embodiment of the instant invention it is to be appreciated that the invention may be embodied otherwise than is herein specifically shown and described and that, within said embodiment, certain changes may be made in the form and arrangement of the parts without departing from the underlying ideas or principles of this invention as set forth in the Claims appended herewith.

I claim:

1. A cleaning device comprising: (a) a support shaft; (b) a retaining plate connected to a distal end of said support shaft by pivot means; (c) a cleaning pad detachably secured to a lower surface of said retaining plate; (d) a fluid reservoir attached to said support shaft, for storing cleaning fluid; and (e) a flat jet spray assembly secured upon said upper surface of said retaining plate, said flat jet spray assembly comprising: a spray head comprising a securing flange at a rear portion thereof; and a front portion having a slot-shaped spray jet outlet being open at side edges and a channel around a center of, and in perpendicular to, said slot-shaped spray jet outlet; a spray nozzle having a horizontal emission slit; said spray nozzle disposed within said channel of said spray head; and a fluid feed tubing having an outlet connecting to said spray nozzle, and having an inlet connecting to said fluid reservoir, fluidly communicating between said fluid reservoir and said spray nozzle; wherein said spray head has a planar mounting seat on an upper side thereof, extending from said rear portion to said channel, along a transverse axis of said spray head; and a tubing connection section of said spray nozzle that connects to said outlet of said fluid feed tubing on said mounting seat.

2. The cleaning device as recited in claim **1**, wherein said pivot means are connected to said retaining plate by a retainer element, and said spray head is disposed in front of said retaining element inside an outline contour of said retaining plate, and within a width of said retaining element.

3. The cleaning device as recited in claim **1**, wherein said slot-shaped spray jet outlet has a substantially rectangular or U-shaped vertical cross-section, and has opposing upper and lower substantially parallel surfaces above and below said horizontal emission slit of said spray nozzle.

4. The cleaning device as recited in claim **1**, wherein said spray nozzle comprises a hollow body having a through-channel therein and said horizontal emission slit at a front face of said body in perpendicular to said through-channel; a locking flange above said hollow body, projecting transversely from a longitudinal axis of said spray nozzle, for positioning of said spray nozzle in said spray head; and a tubing connection section at a rear portion of said spray nozzle.

5. The cleaning device as recited in claim **4**, wherein said spray nozzle is detachably inserted into said channel with said lock flange facing upward and said horizontal emission slit in parallel to said upper and lower surfaces of said slot-shaped spray jet outlet.

6. The cleaning device as recited in claim **1**, wherein said securing flange of said spray head has an inclined base, and an

angle between said inclined base and said upper surface of said retaining plate affects a spray width of said flat jet spray assembly.

7. The cleaning device as recited in claim **1**, wherein said flat jet spray assembly produces a spray width of between about 20 cm and about 80 cm.

8. The cleaning device as recited in claim **1**, wherein said flat jet spray assembly further comprises a shim insert to be positioned underneath said spray head for changing angulation of said spray head for adjusting a spray width.

9. The cleaning device as recited in claim **1**, wherein said slot-shaped spray jet outlet of said spray nozzle has a height that can be selected to affect a spray width of said flat jet spray assembly.

10. The cleaning device as recited in claim **1**, wherein said retaining plate has a shim adjustment element on said upper surface thereof for providing angulation of said spray head to obtain a desired spray width.

11. The cleaning device as recited in claim **1**, wherein said spray nozzle is a fan nozzle, and has several jet outlets arranged at an angle to one another.

12. The cleaning device as recited in claim **1** further comprising a stopping element adjacent to said spray head for preventing said pivot means leaning against said spray head.

13. A flat jet spray assembly for providing a flat jet spray on a flat mop, comprising: (a) a spray head comprising a securing flange at a rear portion thereof; and a front portion having a slot-shaped spray jet outlet being open at side edges and a channel around a center of, and in perpendicular to, said slot-shaped spray jet outlet; (b) a spray nozzle having a horizontal emission slit; said spray nozzle disposed within said channel of said spray head; and (c) a fluid feed tubing having an outlet connecting to said spray nozzle, and having an inlet connecting to a fluid supplier; said flat jet spray assembly being secured upon an upper surface of a flat mophead; wherein said securing flange of said spray head has an inclined base, and an angle between said inclined base and said upper surface of said mophead affects a spray width of said flat jet spray assembly; said flat jet spray assembly further comprising multiple said spray heads, each having a difference in said angle between said inclined base and said upper surface of said mophead, and each of said spray heads enabling a different spray width.

14. The cleaning device as recited in claim **13**, wherein said securing flange has an interface for securing said spray head to said flat mophead by fasten means in a detachable manner.

15. The flat jet spray assembly as recited in claim **13**, wherein said slot-shaped spray jet outlet has a substantially rectangular or U-shaped vertical cross-section, and has opposing upper and lower substantially parallel surfaces above and below said horizontal emission slit of said spray nozzle.

16. The flat jet spray assembly as recited in claim **13**, wherein said spray nozzle comprises a hollow body having a through-channel therein and said emission slit at a front of said body in perpendicular to said through-channel; a locking flange above said hollow body, projecting transversely from a longitudinal axis of said spray nozzle, for positioning of said spray nozzle in said spray head; and a tubing connection section at a rear portion of said spray nozzle.

17. The flat jet spray assembly as recited in claim **16**, wherein said spray nozzle is detachably inserted into said channel with said lock flange facing upward and said emission slit in parallel to said upper and lower surfaces of said slot-shaped spray jet outlet.

18. The flat jet spray assembly as recited in claim **13** further comprising a shim insert to be positioned underneath said spray head for changing angulation of said spray head for adjusting a spray width.

19. The flat jet spray assembly as recited in claim **13**, wherein said spray head has a planar mounting seat on an upper side thereof, extending from said rear portion to said channel, along a transverse axis of said spray head; and feed tubing on said mounting seat.

20. The flat jet spray assembly as recited in claim **13**, wherein said flat jet spray assembly produces a spray width of between about 20 cm and about 80 cm.

21. The flat jet spray assembly as recited in claim **13** further comprising multiple said spray heads, each having a different angle of said horizontal emission slit of said spray nozzle, relative to said upper surface of said flat mophead, and each of said spray heads enabling a different spray width.

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